

### **REMARKS**

Claims 1-24 are pending in this application and claims 1, 5, 9, 10, 15, 16, 19 and 22 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicant regards as his invention. It is believed that this Amendment is fully responsive to the Office Action dated **March 21, 2003**. This response is timely filed by June 23, 2003 since June 21, 2003 was a Saturday.

### **Claim Rejections under 35 USC §102**

Claims 1, 4 and 15 are rejected under 35 USC §102(b) as being anticipated by Takehara et al. (U.S. Patent No. 5,669,987).

Takehara et al. describes a device and method for detecting an abnormality in a solar cell array. This device and method monitors electrical parameters of a solar cell, solar cell strings or sub-arrays. If the solar cell, the solar cell string or sub-array exhibits a relatively low output then an abnormality is determined and a warning is issued. In addition, if the solar cell, solar cell string or sub-array exhibits a large variation ratio then an abnormality is determined and a warning is issued.

The present invention is a diagnostic method and device for a photovoltaic power system. Reference output characteristics are stored in the system based upon installation conditions or based upon past output characteristics. These reference output characteristics are then compared against output characteristics measured during the operation of the system. If the output

characteristic falls below a lower limit diagnosis factor or above an upper limit diagnosis factor then an abnormality is detected.

Takehara et al. does not describe the installation condition being a topography of an installation site, meteorological conditions and the configuration of the photovoltaic power system. Therefore, claim 1 patentably distinguishes over the prior art relied upon by reciting.

“A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of: comparing a reference output characteristic obtained in accordance with an installation condition of said photovoltaic power system with a measured output characteristic in said photovoltaic power system obtained during operation, said installation condition includes a topography of an installation site, meteorological conditions and configuration of the photovoltaic power system; and diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result, wherein said photovoltaic power system is diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output characteristic. (Emphasis Added)

Regarding Claim 15 Takehara et al. does not disclose or suggest that a first and second system are provided at different sites. On the contrary, Takehara et al. shows each string has an inverter, which means that a plurality of systems are provided at one site. Therefore, claim 15 patentably distinguishes over the prior art relied upon by reciting,

“A method for diagnosing the normality/abnormality of an output of a photovoltaic power system, comprising the steps of: obtaining a reference output characteristic at the time of normal operation of a first photovoltaic power system to be diagnosed in accordance with a measurement result of output characteristic of a second photovoltaic power system, said first and second photovoltaic power systems being installed at different sites; measuring an output characteristic in said first photovoltaic power system during operation; comparing the obtained reference output characteristic with the measured output characteristic; and diagnosing the normality/abnormality of the output of said first photovoltaic power system based on the comparison result.” (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 1, 4 and 15 under 35 USC §102(b) as being anticipated by Takehara et al. (U.S. Patent No. 5,669,987) is respectfully requested.

Claims 9, 10, 13, 14, 22 and 23 are rejected under 35 USC §102(a) as being anticipated by Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi).

Asaoka describes a snow accumulation detector for solar cells that operates at night. This snow accumulation detector operates using a strobe light that illuminates the solar cells at night. The accumulated snow evaluation circuit (21) then compares a predetermined voltage taken earlier with a voltage taken during the test. Based upon this comparison and a determination is made whether snow has accumulated on the solar cells.

Claims 9, 10 and 22 patentably distinguish over the prior art relied upon by reciting, as exemplified by claim 9,

“A method for diagnosing the normality/abnormality of an output of a photovoltaic power system, comprising the step of: diagnosing the normality/abnormality of the output of said photovoltaic power system during operation based on a past measurement result of a change with time-lapse of an output characteristic of said photovoltaic power system.” (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 9, 10, 13, 14, 22 and 23 under 35 USC §102(a) as being anticipated by Asaoka (Japanese Patent Publication No. 2000022192 to Mitsubishi) is respectfully requested.

**Claim Rejections under 35 USC §103**

Claim 2 is rejected under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Takeda (U.S. Patent No. 5,594,313).

Takeda describes a solar cell system that stores electric power generated by solar cells and supplies the electric power to a load. This system includes a solar cell assembly having a capacity for generating electric power in a quantity consumed by the load in one day, a quantity being determined from an estimated quantity of solar radiation available on a rainy or cloudy day. This estimate uses a correction factor that embraces temperature changes of solar cells output occurring throughout the year.

Contrary to the Examiner's assertions Takeda does not describe or suggest the installation condition including the topography of an installation site, meteorological conditions and configuration of the photovoltaic power system as recited in amended Claim 1. Therefore, claim 2 is allowable by virtue of its dependence upon an allowable independent claim. Therefore, withdrawal of the rejection of Claim 2 under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Takeda (U.S. Patent No. 5,594,313) is respectfully requested.

Claims 3, 16 and 17 are rejected under 35 USC §103(a) as being unpatentable over Takehara et al. in view of Asaoka.

Claim 16 patentably distinguishes over the prior art relied upon by reciting,

"An apparatus for carrying out a diagnosis of the normality/abnormality of an output of an installed photovoltaic power system and/or a diagnosis of the cause whenever the output of said photovoltaic power system is abnormal, comprising: a storage unit for storing a change with time-lapse of a reference output characteristic at a time of normal operation in accordance with an installation condition of said photovoltaic power system; a measurement unit for measuring a change with time-lapse of an output characteristic in said

photovoltaic power system during operation; and a comparison unit for comparing the change with time-lapse of the reference output characteristic stored in said storage unit with the measured change with time-lapse of the output characteristic obtained by said measurement unit, wherein said photovoltaic power system is diagnosed as normal only if said measured output characteristic is greater than a first predetermined value and less than a second predetermined value, said first and second predetermined values being based on said reference output characteristic.” (Emphasis Added)

Claims 5-8, 11, 12, 19-21 and 24 are rejected under 35 USC §103(a) as being unpatentable over Asaoka in view of Takeda (U.S. Patent No. 5,594,313).

Asaoka teaches diagnosing whether the light receiving surface is covered with snow according to a result of comparison between an output characteristic and a reference characteristic of a solar cell, by a radiating the solar cell with light from a strobe light emitting device after sunset or when the output is low even during daytime.

Figures 10 and 11 of the present invention shows steps of comparing a measured value and a reference value and the same time of day. It is possible to assert that a storing unit stores, in advance, data on the output characteristic with time-lapse, which serves as a reference, and a measuring unit measures data with time-lapse in during operation, and a comparing unit compares the measured value and a reference value at a same time of the day. At least Asaoka, which uses a strobe light emitting device has a light source, does not include a concept of change with time-lapse as described in the present invention. In practice, and is very unlikely to have a fair whether all day but it often happens that clouds may cover the sky for some time, thereby causing a temporary drop in the amount of generated electricity. Even in such a case, a correct diagnosis is possible by comparing the changes with time-lapse.

Claims 5 and 19 patentably distinguish over the prior art relied upon by reciting, as exemplified by claim 5,

“A method for diagnosing the normality/abnormality of an output of an installed photovoltaic power system, comprising the steps of: calculating a change with time-lapse of a reference output characteristic at the time of normal operation in accordance with an installation condition of said photovoltaic power system; measuring a change with time-lapse of an output characteristic in said photovoltaic power system obtained during operation; comparing the calculated change with time-lapse of reference output characteristic with the measured change with time-lapse of output characteristic; and diagnosing the normality/abnormality of the output of said photovoltaic power system based on the comparison result.” (Emphasis Added)

Therefore, withdrawal of the rejection of Claims 5-8, 11, 12, 19-21 and 24 under 35 USC §103(a) as being unpatentable over Asaoka in view of Takeda (U.S. Patent No. 5,594,313) is respectfully requested.

Claims 18 is rejected under 35 USC §103(a) as being unpatentable over Takehara in view of Asaoka as applied to claim 16 above, and further in view of Takeda.

Claim 18 is allowable by virtue of its dependence on allowable independent claim 16. Therefore, withdrawal of the rejection of Claims 18 under 35 USC §103(a) as being unpatentable over Takehara in view of Asaoka as applied to claim 16 above, and further in view of Takeda is respectfully requested.

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**Conclusion**

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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